K. Sham Bhat

CONTACT INFORMATION

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RESEARCH INTERESTS

Computer experiments, Bayesian statistics, space-time statistics, statistical methods for large datasets, Bayesian model averaging, statistical applications to the climate, energy, and defense.

RESEARCH AND PROFESSIONAL EXPERIENCE

Los Alamos National Laboratory, Los Alamos, NM, USA *Scientist* **9/2010-**

Current Projects:

- Climate Science for a Sustainable Energy Future
- Carbon Capture Simulation Initiative-Uncertainty Quantification (Task 6)
- Lifetime Assessment for Polymers Via Aging Models Using Accelerated Lab Data, Enhanced Surveillance Project

EDUCATION

The Pennsylvania State University, University Park, Pennsylvania USA

Ph.D. Statistics Fall 2010

- Dissertation Topic: "Inference for Complex Computer Models and Large Multivariate Spatial Data with Applications to Climate Science"
  Advisor: Dr. Murali Haran

M.S. Statistics, Summer 2007

University of Illinois Urbana-Champaign, Champaign, IL USA

B.S. Electrical Engineering, Fall 2001
Minors: Mathematics, Computer Science

PUBLICATIONS AND PROCEEDINGS

Bhat, K. S., Haran, M., Keller, K., Goes, M. (2012) On parameter learning from computer models with multivariate spatial output using non-separable covariance functions. *Journal of Computational and Graphical Statistics* (to be submitted shortly)

Bhat, K. S., Haran, M., Olson, R., Keller, K. (2011) Inferring likelihoods and climate system characteristics from climate models and spatio-temporal tracer data. *Environmetrics* (under revision)

Bhat, K. S., Haran, M., Terando, A., Keller, K. (2011) Climate Projections Using Bayesian Model Averaging and Space-Time Dependence. *Journal of Agricultural, Biological and Environmental Statistics*

Bhat, K. S. Moore, L., Wendelberger, J., Mebane, D. (2012) A Bayesian Approach for Calibration of a Solid Sorbent Model to Functional Thermogravametric Data. (in preparation)

Mebane, D., Miller, D., Moore, L., Bhat, K.S., Wendelberger, J. (2012) A zwitterion-based model with transport for CO_2 adsorption in mesoporous silica-supported, amine-functionalized sorbents (in preparation).

Bhat, K. S., Birdsell, S., Hamada, M. (2012) A Gaussian Process Based Approach to Modeling Stress-Strain Curve Data (in preparation)

Bhat, K. S., Birdsell, S., Hamada, M. (2012) The Interplay Between Science and Statistics in Modeling Stress-Strain Curve Data *Quality Engineering* (submitted)

Bhat, K.S., Haran, M., and Goes, M. (2010) "Computer model calibration with multivariate spatial output: a case study in climate parameter learning," in "Frontiers of Statistical Decision Making and Bayesian Analysis", eds. M-H. Chen et al., New York: Springer-Verlag, 2010

Dorin, J., Bhat, K. S., Haran, M., Keller, K. (2010) Analyzing Changes in the Meridional Overturning Circulation Using Oceanic Tracer Observations. *Geochemistry, Geophysics, and Geosystems*

Haran, M., Bhat, K. S., Molineros, J., and De Wolf, E. (2009) Estimating the risk of a crop epidemic from coincident spatiotemporal processes. *Journal of Agricultural, Biological and Environmental Statistics*, in press.

Bhat, K. S. Choice of Indicator Levels for Ranking of Watersheds. (2007) *Digital Government Organization Conference 2007 Proceedings* Philadelphia, PA. (refereed for student competiition)

Newlin, J. T. and Bhat, K. S. (2007) Identification and prioritization of stream channel maintenance needs at bridge crossings, *International Bridge Conference Proceedings*, Pittsburgh, PA, (James D. Cooper Student Paper Award).

Invited Talks

Calibration for Large Multivariate Spatial Climate Models. Joint Statistical Meetings, San Diego, CA, August, 2012.

Calibration of Computer Models for Large Multivariate Spatial Data with Climate Applications. Western North American Region-Graybill Conference, Colorado State University, Ft. Collins, CO, June, 2012.

Uncertainty Quantification for Large Multivariate Spatial Computer Model Output with Climate Applications. Climate Uncertainty Quantification Symposium, SIAM Conference on Uncertainty Quantification, Raleigh, NC, April, 2012.

Uncertainty Quantification for Solid Sorbent Models. Perspectives on Uncertainty Quantification, Los Alamos National Laboratory, Los Alamos, New Mexico, November, 2011.

Bayesian Inference for Complex Computer Models and Large MultivariateSpace-Time Data for Climate Science. Joint Statistical Meetings, Miami, FL, August, 2011.

Calibration of Climate Models with Large Multivariate Spatial Output. Yearly Meeting, Albuquerque Chapter of the American Statistical Association, April 2011.

Combining Complex Climate Models with Massive Observational Data for Predicting Climate Change. Joint Statistical Meetings, Vancouver, British Columbia, August, 2010.

Inferring Likelihoods and Climate System Characteristics from Climate Models and Multiple Tracers

- Los Alamos National Laboratory, Los Alamos, New Mexico, April, 2010.
- University of Connecticut, Storrs, Connecticut, April, 2010.
- Argonne National Laboratory, Argonne, Illinois, March, 2010.
- Lawrence Livermore National Laboratory, Livermore, California, February, 2010.

Inferring likelihoods and climate system characteristics from climate models and spatio-temporal tracer data. Joint Statistical Meetings, Washington D.C., August, 2009.

Poster Presentations

Uncertainty Quantification for Carbon Capture Simulation. Conference for Data Analysis, Santa Fe, NM, February 2012.

Inferring Likelihoods and Climate System Characteristics from Climate Models and Multiple Tracers. SAMSI Workshop on Climate Change. Research Triangle Park, NC, February 2010

Inferring likelihoods and climate system characteristics from climate models and Spatio-Temporal tracer data.

- SAMSI Opening Workshop on Space-time Analysis in Environmental Mapping, Epidemiology and Climate Change. Research Triangle Park, NC, September 2009.
- C.R. Rao Prize Day Workshop. Penn State, University Park, PA, May 2009.
- SAMSI Workshop on Sequential Monte Carlo, Research Triangle Park, NC, April 2009.

Estimating the risk of a crop epidemic from coincident spatiotemporal processes. Case Studies in Bayesian Statistics at Carnegie Mellon University, October 2007.

Synergistic Activities and Awards

- Section on Bayesian Statistical Science Student Paper Award, July 2010.
- Member of the American Statistical Association, chair of session at Joint Statistical Meetings, August 2011.
- Statistical and Applied Mathematics Science Institute(SAMSI) Graduate Fellow, Fall 2009.
- Reviewed papers in two journals: Journal of Agricultural, Biological and Environmental Statistics and Environmental Modelling & Software.

Academic Experience

The Pennsylvania State University, University Park, Pennsylvania USA

SAMSI Visiting Graduate Fellow **August, 2009- December 2009**

Graduate Fellow in the SAMSI research program on Space-time Analysis in Environmental Mapping, Epidemiology and Climate Change. Webmaster for working group on Computation, Visualization, and Dimension Reduction in Spatio-Temporal Modeling.

Research Assistant **August, 2009 - present**

Working with the USGS project to combine multiple climate models using Bayesian model averaging.

Instructor **Summer 2008, Summer 2009**

Taught introductory undergraduate course in Statistics (Statistics 200).

Teaching Assistant **2005-2009**

Duties at various times have included grading, office hours, leading weekly recitation and computer lab activities, and substitute teaching for instructor when needed.

Statistical Consulting Experience **2006-2007**

Two semesters of consulting practice at the Statistical Consulting Center, Penn State. Worked on several different projects with real datasets such as multilevel hierarchical models using STATA, clustering categorical variables with missing data, and bootstrapping methods.

Relevant Courses **2004-2008**

Spatial Statistics, Multivariate Analysis, Time Series Analysis, Statistical Computing, Statistical Inference, Climate Change Seminar, Regression, Design/Analysis of Experiments, Theory of Statistics I and II, Stochastic Processes/Simulation, Linear Models, Asymptotic Tools, Statistical Consulting.

Honors and Awards

- Section on Bayesian Statistical Science Student Paper Award, July 2010.
- SAMSI Graduate Fellow, Fall 2009

- Outstanding Poster Award at Case Studies in Bayesian Statistics at Carnegie Mellon University, Pittsburgh, PA, October, 2007.
- Selected Student Paper for Digital Government Conference, Philadelphia, PA, May 2007.
- James D. Cooper Student Award for best student paper at International Bridge Conference, Pittsburgh, PA, June 2007.

COMPUTER SKILLS

- Statistical Packages: R, MINITAB, MATLAB, SAS and SPSS; C and Fortran statistical libraries.
- Languages: C++, Python, some use of Unix shell scripts, Unix/Linux, Mac OS, Windows
- Applications: LaTeX, common Windows database, spreadsheet, and presentation software

CITIZENSHIP United States of America